Final Exam -A-

Level: 1st Year **Date : 14 / 01 /2024**

Material: Network Foundation 1 **Duration :2h**

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Group :.....

Part 1: QCM (8 points)

1. What is the range of TCP and UDP ports that can be used as source ports?
- 1025 to 49151
- 256 to 1023
- 0 to 1058
- 5000 to 35001

2. In which case does a repeater function as a hub?
- When it needs to regenerate a signal
- When it receives a message and does not know the recipient's IP address
- When it informs a sending machine that the frame cannot be delivered
- When there are two collision domains

3. A network administrator wants to expand the area of a LAN. They use:
- A repeater
- A Wi-Fi access point
- A VLAN
- A hub
- A bridge

4. Why does a router check the TTL field of a datagram?
- To check if the message should continue circulating in the network
- To compare the type of medium between the sender and receiver endpoints
- To verify the physical layer protocol information
- To ensure the frame's destination matches the MAC address of the receiving PC

5. What pairs of aggregation modes establish a functional aggregated link between two Cisco switches?
- dynamic auto – dynamic auto
- dynamic desirable – dynamic desirable
- dynamic desirable – access
- dynamic desirable – dynamic auto
- access – dynamic auto

6. What are the functions of the physical layer in the OSI model?
- It encodes frames into electrical, optical, or radio wave signals.
- It accepts frames based on IP addresses.
- It encapsulates data from the network layer into frames.
- It defines the network packet transmission speed.

7. What actions can prevent an attack on VLANs?
- Manually enable trunking.
- Enable routing functionality.
- Use private VLANs.
- Disable the IP protocol.
- Use Nonnegociate command

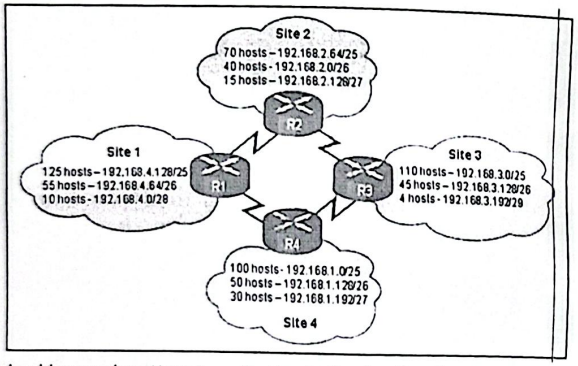
8. What type of packet is used to send an ARP request on the network?
   - A multicast packet
   - A packet with a source MAC address: FF FF FF FF FF FF
   - A packet with TTL = 20
   - A packet with a destination MAC address: FF FF FF FF FF FF

9. In which case does a machine need to use the services of a router?
   - The machine has no local hard disk.
   - The destination IP address is in another network.
   - The machine needs the destination IP address in another network.
   - The machine wants to connect to the internet.

10. Which situations require the use of a distance-vector protocol?
   - The network is very large
   - The routers are powerful
   - Well-suited for networks with high bandwidth
   - Use when the router's capacity is low

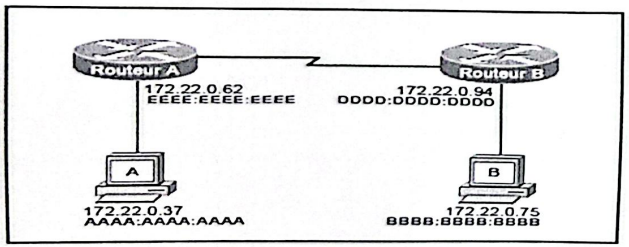
11. Among the following addresses, which ones are valid public addresses?
   - 198.133.219.17
   - 192.168.1.245
   - 10.15.250.5
   - 128.107.12.117
   - 172.16.1.1
   - 64.104.78.227

12. Refer to the image. Which IP addressing scheme(s) should be changed?



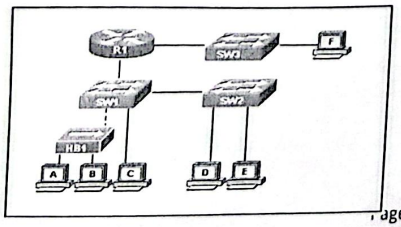
   - Site 1
   - Site 4
   - Site 2
   - Site 3

13. Host A is transmitting data to Host B. Which addresses does Host A use for the destination IP and MAC addresses for this communication?



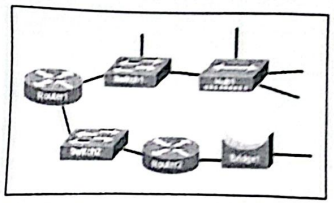
   - Destination MAC: BBBB:BBBB:BBBB, Destination IP: 172.22.0.62
   - Destination MAC: EEEE:EEEE:EEEE, Destination IP: 172.22.0.75
   - Destination MAC: DDDD:DDDD:DDDD, Destination IP: 172.22.0.75
   - Destination MAC: EEEE:EEEE:EEEE, Destination IP: 172.22.0.62
   - Destination MAC: BBBB:BBBB:BBBB, Destination IP: 172.22.0.75
   - Destination MAC: DDDD:DDDD:DDDD, Destination IP: 172.22.0.94

14. Which hosts will receive a frame sent from A to C?



   - Hosts A and B
   - Hosts B and C
   - Hosts D and E
   - Hosts A, B, and C
   - Hosts B, C, D, and E
   - Hosts A, B, C, D, E, and F

15. How many collision domains are there in the diagram?



   - Three
   - Four
   - Five
   - Six
   - Seven
   - Eight

16. What is the role of the "next hop" field in a routing table?
   - To find the next switch towards the destination
   - To determine the number of hops to reach the destination
   - To identify the type of data being sent in the packet
   - To find the next router towards the destination

Part 2: (08 points)

For the following addresses of three machines:

a. **146.245.45.225** belongs to the cybersecurity school.
b. **203.2.48.149** belongs to the AI school.
c. **98.124.36.142** belongs to the mathematics school.

Provide (with justification):

1. The address class, the default network mask, and the network address.
2. The modified subnet mask if the networks have, respectively, (a) **60**, (b) **15**, and (c) **200** subnets.
3. The subnet address and its number.
4. The machine's number in the subnet.
5. The broadcast address.
6. The start and end address ranges of their subnets.

Additionally, the following VLANs must be configured on the switches of the Machine 1 subnet:

   - **VLAN 100**: Cryptography department
   - **VLAN 200**: Network department
   - **VLAN 300**: Administration department
   - **VLAN 400**: Cybercriminality department

7. Describe the purpose of VLANs in this network and how they enhance its structure.
8. Propose two methods to configure VLANs and enable communication between them. Specify the required equipment.

Part 3: (4 points)

Propose a network topology for the National School of Cybersecurity using the following equipment and concepts:

- A Class C addressing system with subnetting
- Routers and Firewall
- Switches
- Wi-Fi access points
- VLANs

You have reached the end of the exam. All the best!